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Interpectoral Nodes in Carcinoma of the Breast: Requiem or Resurrection

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Fifty-eight consecutive patients undergoing a modified radical mastectomy were subjected to complete dissection and pathological assessment of the interpectoral fascia and the group of lymph nodes it contains. The dissection was carried out in all patients, irrespective of whether they were palpable or not. Interpectoral nodes (IPNs) were anatomically present in 28 patients (48%) and were completely absent in 30 patients (52%). Ten patients were Stage I, 18 were Stage II, and 30 were Stage III. Of the 25% (15/58) of patients with microscopic metastasis, only 12/15 had palpable nodes; 66% (10/15) of patients had axillary and apical nodes positive. Significantly, two patients with negative nodes in the axillary and apical group had metastatic Rotter's nodes. Of the 15 patients with positive IPNs, nine had primary tumors located within the upper quadrants of the breast, whereas only five had tumors in lower quadrants and one had a centrally located tumor. The neurovascular bundle to the pectoralis major could be safely preserved in 93% (54/58) of patients. The incidence of impalpable nodes with microscopic metastasis and the evidence of exclusively metastatic interpectoral nodes with uninvolved axillary and apical nodes prompt the following conclusions: (1) interpectoral fascia and nodes should be mandatorily dissected in all patients irrespective of the nodes being palpable or not; (2) the dissection is anatomic and is associated with almost no additional morbidity; (3) the group of patients with IPNs positive and the axillary group negative, would benefit maximally from the IPN dissection. Similarly, this dissection in all other groups of patients would enable a more accurate staging and selection of therapeutic strategies.

KEY WORDS: **Rotter, interpectoral lymph nodes, pectoralis muscles, axillary dissection, nodal metastasis, breast carcinoma**

INTRODUCTION

The radical mastectomy with axillary clearance as performed by Auchincloss [1] facilitated complete removal of all the breast tissue, much of the overlying skin, the pectoral muscles, and axillary lymph nodes. However, the introduction of the modified radical mastectomy allowed preservation of certain structures and left the dissection of yet some other structures to the discretion of the operating surgeon. The Rotter's [2] lymph nodes are a classical example of the latter case. Invaded hitherto infrequently by metastatic cells, these interpectoral nodes (IPNs) are located in the fibrofatty areolar tissue in the intermuscular plane between the pectoralis major and minor muscles. In most recent reports, IPNs have not been routinely looked for nor dissected along with the rest of the axillary nodes. Having been relatively ignored, the prognostic value and correlation of IPNs have been rarely reported or systematically studied. The policy of dissecting IPNs only when palpable runs the risk of undertreating a defi-

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nite subset of patients with micrometastasis in IPNs yet impalpable.

Our study aims at delineating the incidence of positivity of IPNs, their importance, the simple and effective methods for dissection and recommendations for their inclusion in standard operative procedures.

MATERIALS AND METHODS

Fifty-eight consecutive patients undergoing a modified radical mastectomy, per primum, for histologically proven breast cancer were included in the study. Patients with recurrence or those that had received anticancer therapy earlier were excluded. All our patients were females between the ages of 23 and 69 years. Clinical data were compiled and findings pertaining to the site, size of primary tumor, and details of axillary nodes and TNM stage were recorded. Intraoperative findings on palpation of the interpectoral lymph node bed were recorded in two categories, as either palpable or not. This was correlated to the histopathological report to confirm or disprove the axiom of 'interpectoral nodal dissection only when palpable'.

Technique of Dissection

After having raised the skin flaps, the entire breast with the underlying pectoralis fascia was dissected off the pectoralis major. The pectoralis fascia investment was stripped up to the lateral edge of the muscle and, staying in this same subfascial plane with the muscle retracted medially, the fascia covering the undersurface of pectoralis major was stripped. Similarly, the fascial compartment on both surfaces of the pectoralis minor was stripped off. In doing so, all the investing interpectoral fascia and its contents, namely, the IPNs, were completely removed. Medially, the dissection was carried along the edge of the pectoralis minor muscle and curved around its medial border until the axillary vein was encountered. Care was taken to identify and preserve the neurovascular bundle of the pectoralis major viz the thoraco acromial axis.

The pectoralis minor muscle was preserved and its vascular pedicle identified and carefully dissected free, removing all the fibrofatty tissue in this area. The dissected interpectoral tissue was separated from the main specimen, labeled, and sent separately for histological examination.

From this point, the dissection was performed exactly as would be done in a standard modified radical mastectomy [1]. The specimen of the axillary dissection was histopathologically studied after dividing into three groups: (1) apical tissue, (2) interpectoral tissue and (3) remaining axillary tissue. A thorough search for presence of nodes and microscopic metastasis was performed. Correlation of the operative findings, histopathological reports and clinical data regarding size, site, and pattern of axillary nodal involvement was performed.

RESULTS

The frequency and distribution of IPNs and their correlation to clinicopathological data are summarized in Table I.

Interpectoral nodes were anatomically present in 28 patients (48%) and were completely absent in 30 patients (52%). Of the 25% (15/58) of patients with microscopic metastasis, only 12/15 had palpable nodes. Notably, in the remaining three patients, microscopic metastasis was evident despite the nodes not being palpable on surgical exploration. Of the 15 patients with positive IPNs, nine had primary tumors located within the upper quadrants of the breast, whereas only five had tumors in lower quadrants and one had a centrally located tumor. Of patients with IPN metastasis, 66% (10/15) had axillary and apical nodes positive and 34% (5/15) had only the axillary nodes positive and the apical negative. Significantly, two patients (13%) with negative nodes in the axillary group had metastatic disease exclusively in the IPNs.

The neurovascular bundle to the pectoralis major could be safely preserved in 93% (54/58), whereas in four patients, nodal disease engulfed the pedicle endangering the completeness of the dissection. In these patients the pedicle was proactively sacrificed.

DISCUSSION

The actual incidence of the presence of nodes in the interpectoral region has been reported to be in a wide range from 0.06% [3] to 20% [4]. Our study identified nodes in 48%. As noted by Dixon et al. [4], this disparity stems from the technique of dissection and possible exclusion of nodal tissue on the deeper aspect of the muscle.

It is important to note that IPNs exist not only on the anterior aspect of the pectoralis minor [3], but also in the fascia investing the deeper aspect of the pectoralis major muscle. Also, a cleaner dissection around the neurovascular pedicle supplying the pectoralis major muscle improves the yield of IPNs.

The frequency of positivity in our series of 25% is higher than most of the other reports wherein metastatic incidence up to 10% have been found [2,5–7]. This steep increase is attributable to many differences between our study and the previous ones. First, our study entails dissection of all the interpectoral fibrofatty tissue irrespective of whether there are palpable nodes or not. Second, the dissection is more complete and also involves baring the neurovascular pedicle. Third, a large number of our patients are Stage III cancers, with larger tumors, presumably correlating to increased IPN metastasis, as observed by others [4,8]. Palpation on surgical exploration remains a subjective criterion and can be readily misleading as found in our report. Moreover, since the specificity of the gross examination or the interpectoral tissue for metastatic nodes is low, a meticulous dissection seems inescap-

TABLE I: Frequency and Distribution of Interpectoral Nodes (IPN) and Correlation With Clinical and Histopathological Data

		Histopathological evaluation		
		IPN positive (n = 15)	IPN negative (n = 13)	IPN absent (n = 30)
Surgical exploration	Palpable	13	3	0
	Not palpable	2	10	30
Clinical stage	Stage I	2	4	4
	Stage II	3	8	7
	Stage III	10	1	19
Node status	Axillary positive and Apical positive	10	3	17
	Axillary positive and Apical negative	3	6	8
	Axillary negative and Apical negative	2	4	5
Location of primary tumor (quadrant)	Upper outer	5	3	4
	Upper inner	4	0	4
	Lower outer	3	5	13
	Lower inner	2	3	5
	Central	1	2	4

able in all patients. Given the low morbidity and high price of leaving micrometastasis undetected, IPN dissection must be carried out in every patient, irrespective of palpability of the nodes.

The upper quadrant location of most of the tumors with IPN metastasis confirms the view of Rotter that the IPN drains the deep upper portion of the breast. This finding has been independently confirmed by other reports on IPN metastasis.

Based on our findings, further correlation between positivity of IPNs and other axillary nodal groups suggests that it is not extremely uncommon to find an exclusive spread to IPNs alone (13% in our series and up to 7.5 in others) [4,8]. As corroborated by other reports [4,8], this exclusive spread has a sinister implication should it remain undetected. Failure to remove these nodes would understage and subsequently undertreat the patient. Possibly, these undissected positive IPNs may be the cause of axillary recurrence as seen in some cases [9,10]. Furthermore, should there be a local interpectoral nodal recurrence, it would not be detected soon due to its anatomic position. Although it may be reasoned that most patients who have positive IPNs also have axillary nodal metastasis and would receive adjuvant treatment, those patients with exclusive undetected metastasis remain at a grave risk of recurrence of disease, both locally as well as systemically. Other reports have suggested that patients with IPN metastasis alone have a better prognosis [8,11,12]; we have not experienced this in two patients in our study. Clearly, the few patients prevent us from commenting on the prognostic value of this observation. Although the relevance to prognosis of breast cancer cannot be assessed on a long-term basis due to paucity of studies on this topic, we certainly would like to underscore the dangers involved in missing their detection.

CONCLUSIONS

Based on our findings we conclude that: (1) interpectoral fascia and nodes should be mandatorily dissected in all patients irrespective of the nodes being palpable or not, (2) the dissection is anatomic and is associated with almost no additional morbidity, (3) the group of patients with interpectoral nodes positive and axillary group negative would benefit maximally from the IPN dissection. Similarly, this dissection in all other groups of patients would enable a more accurate staging and selection of therapeutic strategies.

REFERENCES

1. Auchincloss H: Significance of location & number of axillary metastasis in carcinoma breast: A justification for a conservative operation. Ann Surg 158, 1:37–46, 1963.
2. Rotter J: Topography Mammary Carcinoma Archiv fur Klinische Chiruguae 58:346–352, 1899.
3. Rehman I, Hiatt N: "Descriptive Atlas of Surgical Anatomy." New York: MacGraw-Hill, 1965.
4. Dixon JM, Dobie V, Chetty U. The importance of interpectoral nodes in breast cancer. Eur J Cancer 3:334–336, 1993.
5. Kay S: Evaluation of Rotter's lymph nodes in radical mastectomy specimens as a guide to prognosis. Cancer 18:141–145, 1965.
6. Cody HS, Egeli RA, Urban JA: Rotter's node metastasis: therapeutic and prognostic considerations in early breast carcinoma. Ann Surg 199:266–270, 1984.
7. Durkin K, Haagensen CD: An improved technique for the study of lymph nodes in surgical specimens. Ann Surg 191:419–429, 1980.
8. Yamasaki N, Kodama H: A role of interpectoral (Rotter's) lymph node dissection in modified radical mastectomy for breast cancer. Nippon Geka Gakkai Zasshi 93:1427–1432, 1992.
9. Fisher B, Wolmark N, Bauer M, Redmond C, Gebhardt M: The accuracy of clinical node staging and of limited axillary dissection

as a determinant of histological node status in carcinoma of the breast. Surg Gynecol Obstet 152:765–767, 1981.
10. Chevinsky AH, Ferrara J, James AG, Minton JP, Young D, Farrar WB: Prospective evaluation of clinical and pathological detection of axillary metastasis in patients with carcinoma of the breast. Surg 108:612–618, 1990.
11. Haagensen CD: "Diseases of the Breast," 3rd ed. Philadelphia: Saunders, 1986.
12. Stewart HJ: Adjuvant systemic therapy for operable breast cancer. Br Med Bull 47:343–356, 1991.

COMMENTARY

The authors of this article have stressed the importance of removal of the interpectoral nodes if the aim of the operation is *cure* or complete and accurage *staging*. I have usually found these nodes located on the under surface of the pectoralis major muscle and in this instance their excision cannot be made in continuity with the axillary contents. I have also found positive interpectoral nodes in patients with an otherwise negative axilla (levels 1, 2, and 3).

In a large series, Senofsky [1] found these nodes involved in 5% of cases and in 15.2% of all node positive patients. In 2.6% these were the only positive nodes; 18.2% had only micrometastases. Rosen [2] also found patients with only the Rotter's nodes positive.

This article appropriately stresses the importance of removal of these nodes, which adds little more than a few minutes to the operation.

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REFERENCES

1. Senofsky GM, Moffat FL, Davisk et al.: Total axillary lymphadenectomy in the management of breast cancer. Arch Surg 126:1336–1342, 1991.
2. Rosen PP, Lesser ML, Kinne DW, Beattie EJ: Discontinuous or "skip" metastases in breast carcinoma. Ann Surg 197:276–283, 1983.